

What is claimed:

1. A method of assaying whether an agent affects heart rate which comprises:

5 (a) contacting a cardiac cell of a heart with an effective amount of a compound to cause a sustainable heart rate;

(b) measuring the heart rate after step (a);

(c) providing the heart with an agent to be assayed for its affects on heart rate;

(d) measuring the heart rate after step (c); and

(e) comparing the difference between step (b) and step (d), thereby determining whether the agent affects heart rate.

15 2. The method of claim 1, wherein the heart is mammalian.

3. The method of claim 1, wherein the cardiac cell is a cardiac myocyte.

4. The method of claim 1, wherein the compound comprises a nucleic acid which encodes MiRP1.

15 5. The method of claim 1, wherein the compound comprises a nucleic acid which encodes an HCN channel.

6. The method of claim 5, wherein the HCN channel is HCN1.

7. The method of claim 5, wherein the HCN channel is HCN2.

8. The method of claim 5, wherein the HCN channel is HCN4.

9. The method of claim 1, wherein the compound comprises nucleic acids which encodes MiRP1 and a HCN channel.

5 10. The method of claim 9, wherein the HCN channel is HCN1.

11. The method of claim 9, wherein the HCN channel is HCN2.

12. The method of claim 9, wherein the HCN channel is HCN4.

13. The method of claim 1, wherein the step of contacting is selected from the group consisting of topical application, injection, electroporation, liposome application, viral-mediated contact, contacting the cell with the nucleic acid, and coculturing the cell with the nucleic acid.

15 14. The method of claim 13, wherein administration of contacting is selected from the group consisting of topical administration, adenovirus infection, viral-mediated infection, liposome-mediated transfer, topical application to the cell, microinjection, and catheterization.

20 15. A method of assaying whether an agent affects heart rate

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which comprises:

(a) disaggregating cardiac myocytes from a heart;

(b) measuring the beating rate of the cardiac myocytes after step (a); (contacting a set of the cardiac myocytes from step (a) with an agent to be assayed for its effects on heart rate;

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(d) measuring the heart rate after step (c); and

(e) comparing the measurements from step (b) and step (d), thereby determining whether the agent affects heart rate.

10. The method of claim 15, wherein the measuring steps are performed with a calcium sensitive dye and a photodiode.

15. A method of assaying whether an agent affects the membrane potential of a cell which comprises:

(a) contacting the cell with a sufficient amount of a compound capable of lessening the negativity of the membrane potential of the cell;

(b) measuring the membrane potential of the cell after step (a);

(c) providing the cell with the an agent to be assayed for its effects on the membrane potential of a cell;

(d) measuring the membrane potential of the cell after step
(c); and

(e) comparing the difference between the measurements from
step (b) and step (d), thereby determining whether the
agent affects the membrane potential of the cell.

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18. A method of assaying whether an agent affects the
activation of a cell which comprises:

(a) contacting the cell with a sufficient amount of a
compound to activate the cell;

(b) measuring the voltage required to activate the cell after
step (a);

(c) providing the cell with an agent to be assayed for its
effects on the activation of the cell;

(d) measuring the voltage required to activate the cell after
step (c); and

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(e) comparing the difference between the measurements from
step (b) and step (d), thereby determining whether the
agent affects the activation of the cell.

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19. A method of assaying whether an agent affects the
contraction of a cell which comprises:

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- 24. The vector of claim 29, wherein the compound comprises a nucleic acid which encodes an HCN channel.
- 25. The vector of claim 33, wherein the HCN channel is HCN1.
- 26. The vector of claim 33, wherein the HCN channel is HCN2.
- 27. The vector of claim 33, wherein the HCN channel is HCN4.
- 28. The vector of claim 29, wherein the compound comprises nucleic acids which encode MiRP1 and a HCN channel.
- 29. The vector of claim 37, wherein the HCN channel is HCN1.
- 30. The vector of claim 37, wherein the HCN channel is HCN2.
- 31. The vector of claim 37, wherein the HCN channel is HCN4.